

## 4. SYSTEM COMPONENT

In a multi air conditioner system that is a free plan direct-expansion type, a connector for inputting and outputting signals to/from the outside is fitted as standard on the control board of the indoor and outdoor units. Use this when you want each unit to input/output signals individually. (Note: When there are many control units it is recommended that you use MELANS. This would enable you to save on labor.) In order to have an input output signal from each connector, you must have a dedicated adapter (sold separately) and a relay circuit (on-site arrangements).  
Note : See next page for actual examples of use.

- Types of control that uses connectors for the outdoor unit / water-source unit input output signal (connection for each type of option).


Category	Application	Function	Connector	
			Y, WY	R2, WR2
Input	Method of disabling cool and heat operation (thermo off) by input from the outside to the outdoor unit.	Comp ON/OFF	CN3D	CN3D
	The low noise operation of the indoor unit can be commenced by the external input to the outdoor unit (water-source unit). (The night mode can be adapted only under the outdoor temperature condition of 30°C [87°F] or less for cooling and 3°C [37°F] or more for heating)	Night mode	CN3D	CN3D
	You can switch the operation mode between cooling and heating by input from the outside to the outdoor unit.	Autochangeover	CN3N	—
	Forces the heat source unit to stop operation by receiving contact signals from the pump interlock circuit	Pump Interlock signal input (level)	TB8 (W-Series)	TB8 (W-Series)
	Forces outdoor unit to perform a fan operation by receiving signals from the snow sensor. (note 10)	Snow sensor signal input	CN3S (Y-Series)	CN3S (R2-Series)
Output	Method of receiving a signal from the outdoor unit (water-source unit) to the outside. ※ Can be used as a device that displays the operation state. ※ Can be used as an interlocked control with external equipment.	Compressor is run state	CN51	CN51
		Error state or frost prevention output (note 8)		
		Operation ON signal (note 9)	TB8	TB8

- Types of control that uses connectors for the indoor unit input output signal (connection for each type of option)

Category	Application	Function	Connector
Input (Note 2,3)	Method of ON/OFF control by turning on and off switches or contacts from an outside to each indoor unit group. Can be used as a timer adapter (Note 1) Can be used as a "forget to switch off prevention" or "forced stop".	Distant/local switching (note 1)	CN32
		ON/OFF (level)	
	Method of ON/OFF control by inverting start/stop using external pulse (a-contact) for each indoor unit group.	ON/OFF (pulse)	CN51
Output	Method of sending signals to outside for each indoor unit group. It can be used as a device to display operation states. It can be used as an interlocked control with the external equipment.	Operation state	CN51
		Error state	
		Operation mode (heat) state	CN52
		Operation mode (cool, dry) state	
		Thermo ON (fan) state	

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- Note 1: Connect the signal input only to the principal unit in a group.  
(However, the demand input is required to enter into indoor units individually.)
- Note 2: When using start/stop input at group operation, Local remote controller is necessary.  
(MA remote controller or M-NET remote controller)
- Note 3: When setting to Remote, operation can not be performed from Local remote controller.  
The remote controller displays [CENTRAL] / [CENTRALLY CONTROLLED] / .
- Note 4: When using start/stop input at group operation, [Automatic address start-up] can not be performed.
- Note 5: When CN51 or CN52 is commonly used as an output signal, be sure to use the remote display kit.
- Note 6: The remote display kit can be used for the input signal of CN51 and CN52.
- Note 7: Connect to the principal unit only when using [Operating status] or [Operation mode (Heating/Cooling-Dry) of signal output. Connect to indoor units individually when using [Error status] or [Thermostat ON (or fan) status]
- Note 8: The error state of the heat source unit can be output when Dip SW3-3 is OFF.  
When Dip SW3-3 is ON, the signal is output only when the heat source unit is stopped and the water temperature (TH6) is 5°C[41°F] or lower.
- Note 9: When Dip SW2-7 is OFF, the operation ON signal is output only when the compressor is in operation.  
When Dip SW2-7 is ON, the signal is output when cooling or heating operation signal from the controller is received. (The signal is kept active even if the compressor stops due to thermo OFF.)
- Note 10: When multiple outdoor units exist in one refrigerant circuit, settings on every outdoor unit (signal input) are required.

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It is possible to have ON/OFF control by turning the indoor unit power on and off. You can select functions by setting the DipSW1-9 and 1-10 on the indoor unit.

### ■ Types of ON/OFF control (indoor unit settings)

It is possible to have ON/OFF control for each indoor unit (or group) by dip switches 9 and 10 (SW1-9, SW1-10) of the indoor unit.

Function	Operation when indoor unit recovers	Setting SW 2 (note 1)	
		9	10
All auto restart	All indoor units will always restart regardless of the state that was before the power was turned off (POWER OFF) (after 5 minutes).	OFF	ON
Auto recovery	Indoor units which are operated before the power was turned off (POWER OFF) will restart (after 5 minutes).	ON	OFF
All OFF	Operation stays stopped regardless of the state that was before the power was turned off.	OFF	OFF

Note 1. The dip switch setting for all units in the indoor unit group is required.

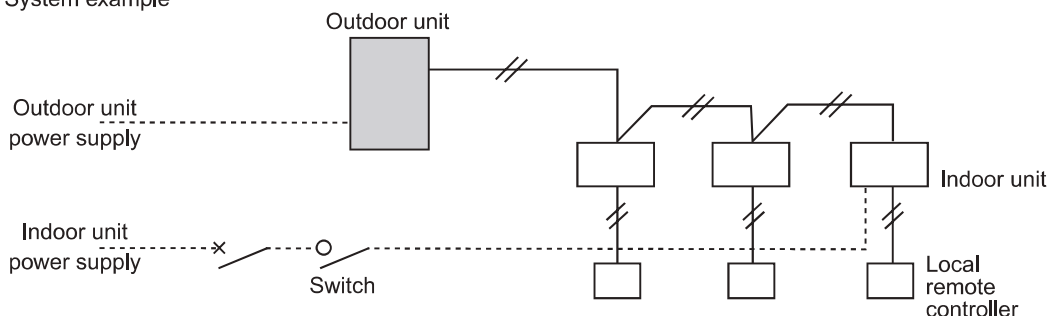
Note 2. Do not cut-off the power to the outdoor unit. If you do, it will disconnect the power to the crankcase heater of the outdoor unit and that could cause damage to the compressor.

Note 3. This cannot be applied to the power ON/OFF of the drain pump and humidifier equipment.

### ■ Description of when using distant/local switching (CN32)

SW1 Local switching	SW2 ON/OFF	State	Remote controller display/operation
OFF	OFF	Local / Permit	The operation permit
ON	OFF	Distant / Stop	It displays "CENTRALLY CONTROLLED", while the state is distant.
ON	ON	Distant / Operate	It prohibits ON/OFF operation of remote controller.

### ■ System example



When the power to the outdoor unit is cut-off for a long time, the crankcase heater for the compressor also stops. If the compressor is started soon after the power is restored, there is a chance that a fault will occur in the compressor. When using the above function, make sure the power to the outdoor units will not be cut-off.

### ■ Limitations to combining system controls

	Description		Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	—	× ※1	× ※1	× ※1
2	Pulse ON/OFF	CN51		—	○	○
3	HA ON/OFF (JEMA)	CN51			○	○
4	Power ON/OFF	-			—	×
5	Automatic recover	-				—

※1: Pulse ON/OFF, Power ON/OFF and automatic recover can only be used when the distant/local setting (CN32) is set to local. Therefore, always avoid this function when combining control.

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### 4-1. Y-, R2-, H2i®, S-Series

CITY MULTI system can be monitored or controlled with signal to/from the outside as every control board of Indoor unit or Outdoor unit has input/output signal connectors. Independent control to the individual Indoor or Outdoor can be carried out by using these connectors. Yet, for large-scale control, MELANS would be much easier. When using input/output connectors, a dedicated adapter (optional part) and a relay circuit needed to be prepared by the site.

Following are some typical example.

Table 4-1. Control can be achieved by using Outdoor input/output connectors.

Function	Usage	Using connector		Signal	Option
		PUHY	PURY		
Demand	Prohibiting cooling/heating operation (thermo OFF) by an external input to the outdoor unit. * It can be used as the demand control for each refrigerant system.	CN3D	CN3D	Input (level-signal)	Adapter for external input (PAC-715AD)
Low noise mode	Performs a low noise operation of the outdoor unit by an external input to the outdoor unit. * It can be used as the low noise operation device for each refrigerant system.				
Snow sensor signal input	Forces the outdoor unit to perform a fan operation by receiving signals from the snow sensor. *4	CN3S	CN3S	Output (level-signal)	Adapter for external output (PAC-725AD)
System changeover	Cooling/heating operation can be changed by an external input to the outdoor unit.	CN3N	-		
Operation status of the compressor	How to extract signals from the outdoor unit. * It can be used as an operation status display device.	CN51	CN51		
Error status	* It can be used for an interlock operation with external devices.				

\*1 For details, refer to 1) through 4) shown below.

\*2 Low noise mode is valid when Dip SW4-4 on the outdoor unit is set to OFF. When DIP SW4-4 is set to ON, 4 levels of on-DEMAND are possible, using different configurations of low noise mode input and DEMAND input settings.

When 2 or more outdoor units exist in one refrigerant circuit system, 8 levels of on-DEMAND are possible. When 3 outdoor units exist in one refrigerant circuit system, 12 levels of on-DEMAND are possible.

\*3 Low noise mode can be switched from ability main to low noise main with Dip SW5-5 on the outdoor unit. Dip SW5-5 OFF: ability main (ability main mode : The sound pressure level is reduced by limiting the maximum fan frequency under the following condition. Cooling mode : outdoor temp. (TH6) < 30°C Heating mode : outdoor temp. (TH6) > 3°C), ON: low noise main.

\*4 When multiple outdoor units exist in one refrigerant circuit system, settings on every outdoor unit (signal input) are required.

\*5 For detailed drawing, refer to "4-2. Outdoor unit input/output connector".

1) Table 4-1-1 SW4-4: OFF (Compressor ON/OFF, Low noise mode)

CN3D 1-3P	2-level of on-Demand *6
Open	100%(No Demand)
Short-circuit	0%
CN3D 1-2P	Low noise mode *7
Open	OFF
Short-circuit	ON

\*6 When SW4-4 on the outdoor unit in one refrigerant circuit system is set to ON (4 levels or 8 levels or 12 levels of on-DEMAND), this function cannot be used.

\*7 This function and the 4 levels or 8 levels on-DEMAND function can be used together. Input the order to CN3D 1-2P on the outdoor unit whose SW4-4 is set to OFF.

2) When SW4-4 on one outdoor unit in one refrigerant circuit system is set to ON (4 levels of on-DEMAND) (\*8)

	CN3D 1-2P	
CN3D 1-3P	Open	Short-circuit
Open	100% (No DEMAND)	75%
Short-circuit	0%	50%

Note the following steps to be taken when using STEP DEMAND.

Example: When switching from 100% to 50%

Steps in DEMAND level setting	<WRONG>	100%	→	10%	→	50%
	<CORRECT>	100%	→	75%	→	50%

If the demand settings are switched in the wrong order listed as the wrong example above, the unit may go into thermo OFF mode.

The percentage of the DEMAND listed in the table above is an approximate value based on the compressor volume and does not necessarily correspond with the capacity.

This function and the Low noise mode function cannot be used together.

3) When SW4-4 on the two outdoor units in one refrigerant circuit system is set to ON (8 levels of on-DEMAND) (\*8,\*9)

8 levels of on-DEMAND		No.2 CN3D					
No.1 CN3D	1-2P	1-2P	Open		Short-circuit		
	1-3P	1-3P	Open	Short-circuit	Open	Short-circuit	
	Open	Open	100% (No DEMAND)	50%	88%	75%	
	Short-circuit	Short-circuit	50%	0%	38%	25%	
		Open	88%	38%	75%	63%	
		Short-circuit	75%	25%	63%	50%	

4) When SW4-4 on the all outdoor units in one refrigerant circuit system is set to ON (12 levels of on-DEMAND) (\*9)

12 levels of on-DEMAND	No.2 CN3D	1-2P	Open							
	1-3P	1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
	1-3P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
No.1 CN3D	1-2P	Open	100%	67%	92%	84%	67%	34%	59%	50%
	Open	Open	67%	34%	59%	50%	34%	0%	25%	17%
	Short-circuit	Open	92%	59%	84%	75%	59%	25%	50%	42%
	Short-circuit	Short-circuit	84%	50%	75%	67%	50%	17%	42%	34%
12 levels of on-DEMAND	No.2 CN3D	1-2P	Short-circuit							
	1-3P	1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
	1-3P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
No.1 CN3D	1-2P	Open	92%	59%	84%	75%	84%	50%	75%	67%
	Open	Open	59%	25%	50%	42%	50%	17%	42%	34%
	Short-circuit	Open	84%	50%	75%	67%	75%	42%	67%	59%
	Short-circuit	Short-circuit	75%	42%	67%	59%	67%	34%	59%	50%

\*8 Input the order to CN3D on the outdoor unit whose SW4-4 is set to ON.

\*9 CN3D of No. 1, 2, 3 can be selected arbitrary with the outdoor unit whose SW4-4 is set to ON.

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Table 4-2. Control can be achieved by using Indoor input/output connectors.

Function	Usage	Using connector	Signal
Remote/Local switching *1 ON/OFF *2*3	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of the head Indoor in an Indoor group. It can be interlocked with timer, door, window, or other equipment to "Force stopping"	CN32	Input (level-signal)
ON/OFF *2*3	Indoor group can be controlled ON/OFF by an external pulse signal input to the connector of the head Indoor in an Indoor group.	CN51	Input (pulse-signal)
Demand	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of every Indoor in an Indoor group.	CN52	Input (pulse-signal)
Monitoring ON/OFF state	Signal output from a head Indoor unit, presenting its Indoor group.	CN51	Output
Monitoring heating state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	
Monitoring cooling/drying state		CN52	
Monitoring Error state	Signal output from every Indoor unit, for monitoring Error or Thermo-off (fan) state.	CN51	Output
Monitoring Thermo-OFF (fan) state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	

\*1. When switching to Remote, control at Local remote controller will NOT be effective, but the "CENTRALLY CONTROLLED" is displayed.

\*2. MA or ME remote controller is needed for this function.

\*3. If using ON/OFF input function, Automatic-address-start-up can not be performed to start-up the system at commissioning.

\*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-2 are no more available.

Details are available at the PLC software Instruction Manual.

Table 4-3. ON/OFF control to each Indoor unit (group) by using Dip Switch 9 and 10 (SW1-9, SW1-10) of the Indoor unit.

Function	Operation on Indoor units	Setting Dip Switch *1*4	
		1-9	1-10
Auto ON	All indoor units will turn ON and automatically resume to its previous mode after 5 minutes from power recovery.	OFF	ON
Auto recovery	Indoor unit recovers to its previous state (ON/OFF, mode) after 5 minutes from power recovery.	ON	OFF
All OFF	Forced stopping regardless of Indoor units' state.	OFF	OFF

\*1. The Dip Switch setting should be carried out on every Indoor unit in the group.

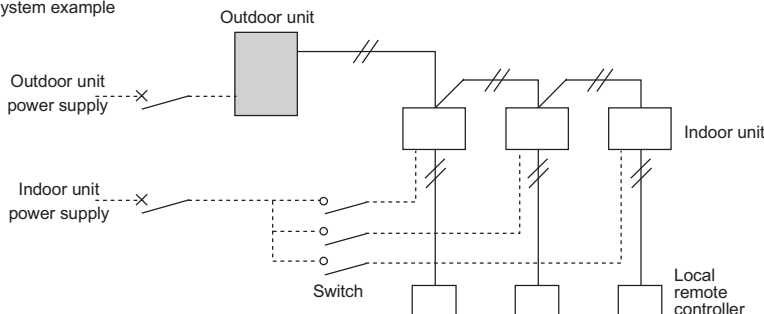
\*2. Outdoor unit's power supply should NOT be cut. Otherwise, power supply to case heater of the compressor would be cut too, which may cause damage to the compressor.

\*3. Above method can not be applied to the power ON/OFF of the drain pump and humidifier equipment.

\*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-3 are no more available.

### System example



Restart of the CITY MULTI needs to be careful. When no power supply to the outdoor unit, no power supply to the compressor case heater too. The compressor needed to be warmed up before running. When using above functions, power supply to the outdoor unit should be ensured.

Table 4-4. How to use Remote/Local switching connector CN32

State	Local remote controller display and operation	CN32-SW-1 for Local/Remote control switching	CN32-SW-2 for Remote "ON/OFF" operation
Local remote controller control	Operation is permitted	OFF	OFF
Remote STOP	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	OFF
Remote START	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	ON

\* For details refer to CN32 in section "4-5. Indoor unit "E" type input/output connector".

Table 4-5. Limitations to combining system controls

	Description	Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	-	×	×
2	Pulse ON/OFF	CN51	-	○	○
3	HA ON/OFF (JEMA)	CN51		○	○
4	Power ON/OFF	-		-	×
5	Automatic recover	-			-

\*1. Pulse ON/OFF, power ON/OFF and automatic recover can only be used when the remote/local setting CN32 is set to local.

Therefore, always avoid this function when combining control.

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### 4-2. Outdoor unit input/output connector (Y-, R2-, S-Series)

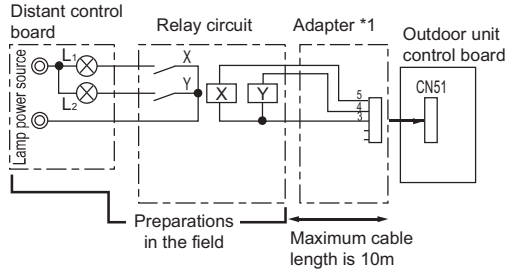


#### Caution:

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

#### 4-2-1. Output

- State (CN51)



L1 : Outdoor unit error display lamp  
 L2 : Compressor operation lamp (compressor running state)  
 X, Y : Relay (coil  $\leq 0.9W$  : 12VDC)

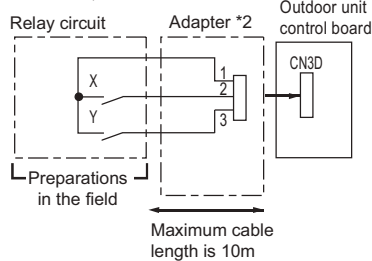
\*1. Optional part : PAC-725AD or field supply.

#### 4-2-2. Input

##### Y, H2i, R2 series

- (1) Step demand and Low noise mode (CN3D)

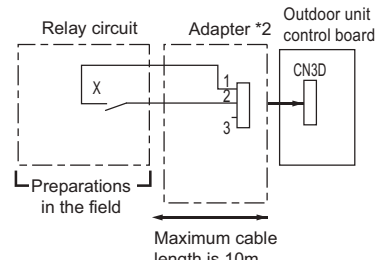
For details, refer to "Table 4-1-1".



X : Low noise mode or demand  
 Y : Demand  
 X, Y : Relay Contact rating voltage  $\geq 15VDC$   
 Contact rating current  $\geq 0.1A$   
 Minimum applicable load  $\leq 1mA$  at DC

\*2. Optional part : PAC-715AD or field supply.

- (2) Low noise mode (CN3D + DipSW4-4 OFF)



X : Relay Contact rating voltage  $\geq 15VDC$   
 Contact rating current  $\geq 0.1A$   
 Minimum applicable load  $\leq 1mA$  at DC

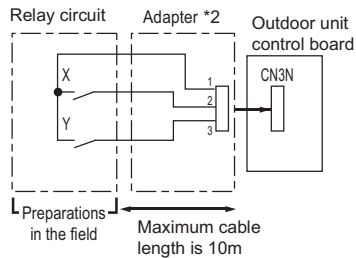
\*2. Optional part : PAC-715AD or field supply.

Low noise mode : The sound pressure level is reduced by controlling the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level can not be reduced, when neither the fan frequency nor the compressor frequency are maximum.

- (3) System Changeover (CN3N) (R2 excluded)

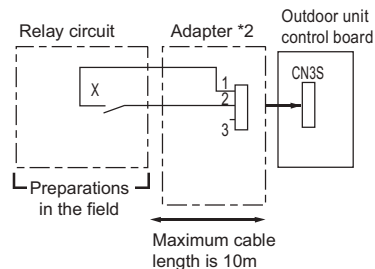


X : Cooling / Heating  
 Y : Validity / Invalidity of X  
 X, Y : Relay Contact rating voltage  $\geq 15VDC$   
 Contact rating current  $\geq 0.1A$   
 Minimum applicable load  $\leq 1mA$  at DC

\*2. Optional part : PAC-715AD or field supply.

		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating

- (4) Snow sensor (CN3S)



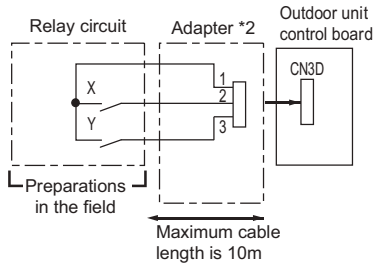
X : Relay Contact rating voltage  $\geq 15VDC$   
 Contact rating current  $\geq 0.1A$   
 Minimum applicable load  $\leq 1mA$  at DC

\*2. Optional part : PAC-715AD or field supply.

Snow sensor : The outdoor fan runs when X is closed in stop mode or thermostat mode.

## S-Series

### (1) Step demand and Silent mode (Night mode) (CN3D)



X, Y : Relay Contact rating voltage  $\geq 15\text{VDC}$   
 Contact rating current  $\geq 0.1\text{A}$   
 Minimum applicable load  $\leq 1\text{mA}$  at DC

\*2. Optional part : PAC715AD or field supply.  
 DipSW8-1 ON (Step demand only)

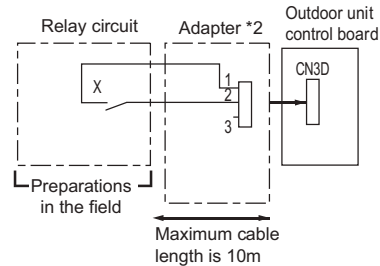
		X	
		OFF	ON
Y	OFF	100%	75%
	ON	0%	50%

\*They are rough values.

DipSW8-1 OFF (Compressor ON/OFF and Silent mode [Night mode])

Y	Compressor ON/OFF	X	Low noise mode
OPEN	ON	OPEN	OFF
SHORT	OFF	SHORT	ON

### (2) Silent mode (Night mode) (CN3D + DipSW8-1 OFF)



X : Relay Contact rating voltage  $\geq 15\text{VDC}$   
 Contact rating current  $\geq 0.1\text{A}$   
 Minimum applicable load  $\leq 1\text{mA}$  at DC

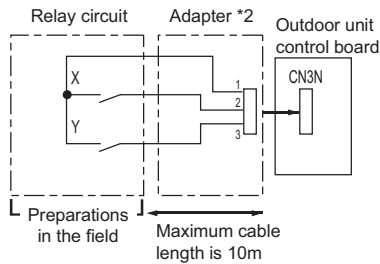
\*2. Optional part : PAC-715AD or field supply.

Silent mode : The sound pressure level is reduced by controlling (Night mode) the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level cannot be reduced, when neither the fan frequency nor the compressor frequency are maximum.

### (3) System changeover (CN3N)



SW1 : Cooling / Heating

SW2 : Validity / Invalidity of X

X, Y : Relay Contact rating voltage  $\geq 15\text{VDC}$   
 Contact rating current  $\geq 0.1\text{A}$   
 Minimum applicable load  $\leq 1\text{mA}$  at DC

\*2. Optional part : PAC-715AD or field supply.

		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating



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### 4-3. WY, WR2-Series

CITY MULTI system can be monitored or controlled with signal to/from the outside as every control board of Indoor unit or water source unit has input/output signal connectors. Independent control to the individual Indoor or water source can be carried out by using these connectors. Yet, for large-scale control, MELANS would be much easier. When using input/output connectors, a dedicated adapter (optional part) and a relay circuit needed to be prepared by the site.

Following are some typical example.

Table 4-1. Control can be achieved by using water source input/output connectors.

Function	Usage	Using connector		Signal	Option
		PQHY	PQRY		
Demand	Prohibiting cooling/heating operation (thermo OFF) by an external input to the water source unit. * It can be used as the demand control for each refrigerant system.	CN3D	CN3D	Input (level-signal)	Adapter for external input (PAC-715AD)
Low noise mode	Performs a low noise operation of the water source unit via external input to the water source unit. * It can be used as the low noise operation device for each refrigerant system.				
Pump Interlock signal input	Forces the water source unit to stop operation by receiving contact signals from the pump interlock circuit	TB8	TB8		
System changeover	Cooling/heating operation can be changed by an external input to water source unit.	CN3N	-		Adapter for external output (PAC-715AD)
Operation status of the compressor	How to extract signals from the water source unit. * It can be used as an operation status display device.	CN51	CN51	Output (level-signal)	
Error status	* It can be used for an interlock operation with external devices.				
Operation ON signal		TB8	TB8		

\*1 For details, refer to 1) through 4) shown below.

\*2 Low noise mode is valid when Dip SW4-4 on the water source unit is set to OFF. When DIP SW4-4 is set to ON, 4 levels of on-DEMAND are possible, using different configurations of low noise mode input and DEMAND input settings.

When 2 or more heat source units exist in one refrigerant circuit system, 8 levels of on-DEMAND are possible. When 3 water source units exist in one refrigerant circuit system, 12 levels of on-DEMAND are possible.

\*3 For detailed drawing, refer to "4-4. water source unit input/output connector".

1) Table 4-1-1 SW4-4: OFF (Compressor ON/OFF, Low noise mode)

CN3D 1-3P	2-level of on-Demand *4
Open	100%(No Demand)
Short-circuit	0%
CN3D 1-2P	Low noise mode *5
Open	OFF
Short-circuit	ON

\*4 When SW4-4 on the water source unit in one refrigerant circuit system is set to ON (4 levels or 8 levels or 12 levels of on- DEMAND), this function cannot be used.

\*5 This function and the 4 levels or 8 levels on-DEMAND function can be used together. Input the order to CN3D 1-2P on the heat source unit whose SW4-4 is set to OFF.

2) When SW4-4 on one heat source unit in one refrigerant circuit system is set to ON (4 levels of on-DEMAND) (\*6)

CN3D 1-2P		
CN3D 1-3P	Open	Short-circuit
Open	100% (No DEMAND)	75%
Short-circuit	0%	50%

Note the following steps to be taken when using STEP DEMAND.

Example: When switching from 100% to 50%

Steps in DEMAND level setting	<WRONG>	100%	→	10% → 50%
	<CORRECT>	100%	→	75% → 50%

If the demand settings are switched in the wrong order listed as the wrong example above, the unit may go into thermo OFF mode.

The percentage of the DEMAND listed in the table above is an approximate value based on the compressor volume and does not necessarily correspond with the capacity.

This function and the Low noise mode function cannot be used together.

3) When SW4-4 on the two water source units in one refrigerant circuit system is set to ON (8 levels of on-DEMAND) (\*6,\*7)

8 levels of on-DEMAND		No.2 CN3D					
No.1 CN3D	1-2P	1-2P	Open		Short-circuit		
		1-3P	Open	Short-circuit	Open	Short-circuit	
	Open	Open	100% (No DEMAND)	50%	88%	75%	
	Short-circuit	Short-circuit	50%	0%	38%	25%	
	Short-circuit	Open	88%	38%	75%	63%	
		Short-circuit	75%	25%	63%	50%	

4) When SW4-4 on the all water source units in one refrigerant circuit system is set to ON (12 levels of on-DEMAND) (\*7)

12 levels of on-DEMAND	No.2 CN3D	1-2P	Open							
		1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
No.1 CN3D	1-2P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
	Open	Open	100%	67%	92%	84%	67%	34%	59%	50%
		Short-circuit	67%	34%	59%	50%	34%	0%	25%	17%
	Short-circuit	Open	92%	59%	84%	75%	59%	25%	50%	42%
		Short-circuit	84%	50%	75%	67%	50%	17%	42%	34%
12 levels of on-DEMAND	No.2 CN3D	1-2P	Short-circuit							
		1-3P	Open				Short-circuit			
	No.3 CN3D	1-2P	Open		Short-circuit		Open		Short-circuit	
No.1 CN3D	1-2P	1-3P	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit	Open	Short-circuit
	Open	Open	92%	59%	84%	75%	84%	50%	75%	67%
		Short-circuit	59%	25%	50%	42%	50%	17%	42%	34%
	Short-circuit	Open	84%	50%	75%	67%	75%	42%	67%	59%
		Short-circuit	75%	42%	67%	59%	67%	34%	59%	50%

\*6 Input the order to CN3D on the heat source unit whose SW4-4 is set to ON.

\*7 CN3D of No. 1, 2, 3 can be selected arbitrary with the water source unit whose SW4-4 is set to ON.



## 4. SYSTEM COMPONENT

Table 4-2. Control can be achieved by using Indoor input/output connectors.

Function	Usage	Using connector	Signal
Remote/Local switching *1 ON/OFF *2*3	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of the head Indoor in an Indoor group. It can be interlocked with timer, door, window, or other equipment to "Force stopping"	CN32	Input (level-signal)
ON/OFF *2*3	Indoor group can be controlled ON/OFF by an external pulse signal input to the connector of the head Indoor in an Indoor group.	CN51	Input (pulse-signal)
Demand	Indoor group can be controlled ON/OFF by an ON/OFF switching or contact input to the connector of every Indoor in an Indoor group.	CN52	Input (pulse-signal)
Monitoring ON/OFF state	Signal output from a head Indoor unit, presenting its Indoor group.	CN51	Output
Monitoring heating state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	
Monitoring cooling/drying state		CN52	
Monitoring Error state	Signal output from every Indoor unit, for monitoring Error or Thermo-off (fan) state.	CN51	Output
Monitoring Thermo-OFF(fan) state	It can be used for monitoring or interlock with other equipment purpose and so on.	CN52	

\*1. When switching to Remote, control at Local remote controller will NOT be effective, but the "CENTRALLY CONTROLLED" is displayed.

\*2. MA or ME remote controller is needed for this function.

\*3. If using ON/OFF input function, Automatic-address-start-up can not be performed to start-up the system at commissioning.

\*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-2 are no more available.

Details are available at the PLC software Instruction Manual.

Table 4-3. ON/OFF control to each Indoor unit (group) by using Dip Switch 9 and 10 (SW1-9, SW1-10) of the Indoor unit.

Function	Operation on Indoor units	Setting Dip Switch *1*4	
		1-9	1-10
Auto ON	All indoor units will turn ON and automatically resume to its previous mode after 5 minutes from power recovery.	OFF	ON
Auto recovery	Indoor unit recovers to its previous state (ON/OFF, mode) after 5 minutes from power recovery.	ON	OFF
All OFF	Forced stopping regardless of Indoor units' state.	OFF	OFF

\*1. The Dip Switch setting should be carried out on every Indoor unit in the group.

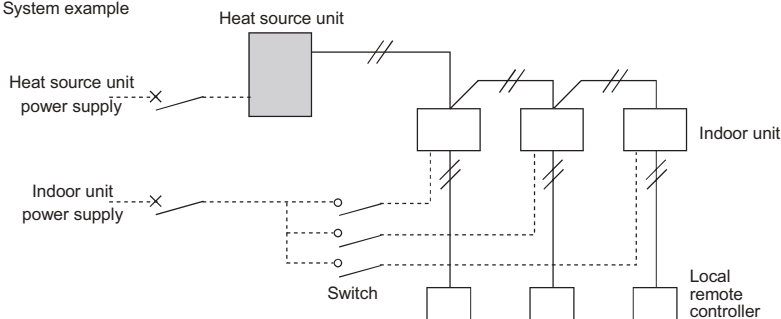
\*2. Heat source unit's power supply should NOT be cut. Otherwise, power supply to case heater of the compressor would be cut too, which may cause damage to the compressor.

\*3. Above method can not be applied to the power ON/OFF of the drain pump and humidifier equipment.

\*4. If CITY MULTI use GB-50ADA/AG-150 and PLC software to control the Indoor unit via its external input/output connectors, Dip Switch 1-9 and Dip Switch 1-10 should be set to ON.

In this case, the input/output connectors act as normal connectors, functions mentioned at Table 4-3 are no more available.

### System example



Restart of the CITY MULTI needs to be careful. When no power supply to the heat source unit, no power supply to the compressor case heater too. The compressor needed to be warmed up before running. When using above functions, power supply to the heat source unit should be ensured.

Table 4-4. How to use Remote/Local switching connector CN32

State	Local remote controller display and operation	CN32-SW-1 for Local/Remote control switching	CN32-SW-2 for Remote "ON/OFF" operation
Local remote controller control	Operation is permitted	OFF	OFF
Remote STOP	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	OFF
Remote START	"CENTRALLY CONTROLLED" flashing, "ON/OFF" at local remote controller is not possible.	ON	ON

\* For details refer to CN32 in section "4-5. Indoor unit "E" type input/output connector".

Table 4-5. Limitations to combining system controls

	Description	Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	-	X*1	X*1
2	Pulse ON/OFF	CN51	-	O	O
3	HA ON/OFF(JEMA)	CN51		O	O
4	Power ON/OFF	-		-	X
5	Automatic recover	-			-

\*1. Pulse ON/OFF, power ON/OFF and automatic recover can only be used when the remote/local setting CN32 is set to local.

Therefore, always avoid this function when combining control.

## 4. SYSTEM COMPONENT

### 4-4. Water-source input/output connector

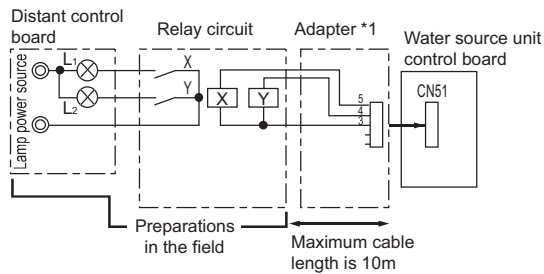


#### Caution:

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

#### 4-4-1. Output

- State (CN51)



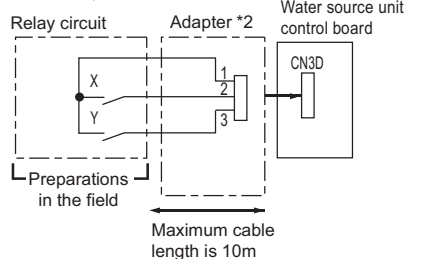
L1 : Water source unit error display lamp  
L2 : Compressor operation lamp (compressor running state)  
X, Y : Relay (coil  $\leq 0.9W$  : 12VDC)

\*1. Optional part : PAC-725AD or field supply.

#### 4-4-2. Input

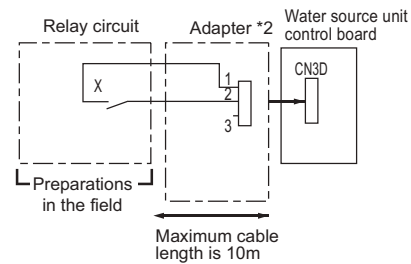
- (1) Step demand and Low noise mode (CN3D)

For details, refer to "Table 4-1-1".



X : Low noise mode or demand  
Y : Demand  
X, Y : Relay Contact rating voltage  $\geq 15VDC$   
Contact rating current  $\geq 0.1A$   
Minimum applicable load  $\leq 1mA$  at DC  
\*2. Optional part : PAC-715AD or field supply.

- (2) Low noise mode (CN3D + DipSW4-4 OFF)



X : Relay Contact rating voltage  $\geq 15VDC$   
Contact rating current  $\geq 0.1A$   
Minimum applicable load  $\leq 1mA$  at DC

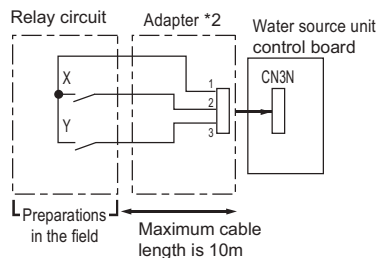
\*2. Optional part : PAC-715AD or field supply.

Low noise mode : The sound pressure level is reduced by controlling the maximum fan frequency and compressor frequency.

-Note-

The sound pressure level can not be reduced, when neither the fan frequency nor the compressor frequency are maximum.

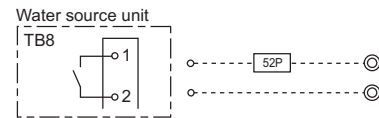
- (3) System Changeover (CN3N) (WR2 excluded)



X : Cooling / Heating  
Y : Validity / Invalidity of X  
X, Y : Relay Contact rating voltage  $\geq 15VDC$   
Contact rating current  $\geq 0.1A$   
Minimum applicable load  $\leq 1mA$  at DC  
\*2. Optional part : PAC-715AD or field supply.

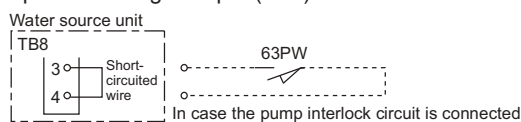
		X	
		OFF	ON
Y	OFF	Normal	
	ON	Cooling	Heating

- (4) Operation ON signal (TB8)



X : Relay (Contact rating 200VAC 1A)  
52P : Pump contactor

- (5) Pump Interlock signal input (TB8)



When connecting the pump interlock circuit to terminals 3 and 4 on TB8, remove the short-circuited wire.

63PW : Pressure switch (Contact: Minimum applied load 5mA)

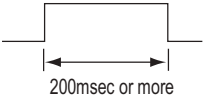
## 4-5. Indoor unit “-E” type input/output connector



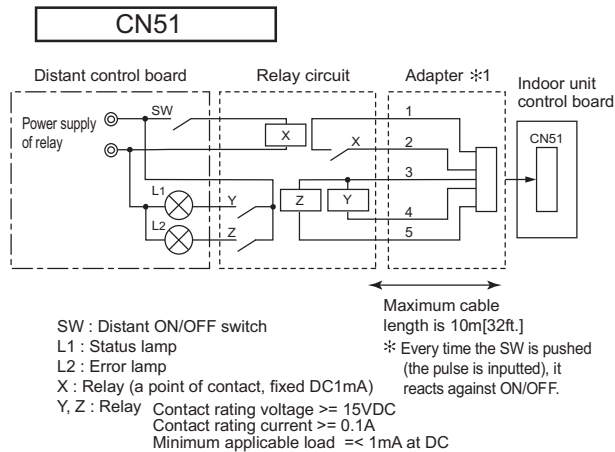
**Caution:**

1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have 2750V or more.

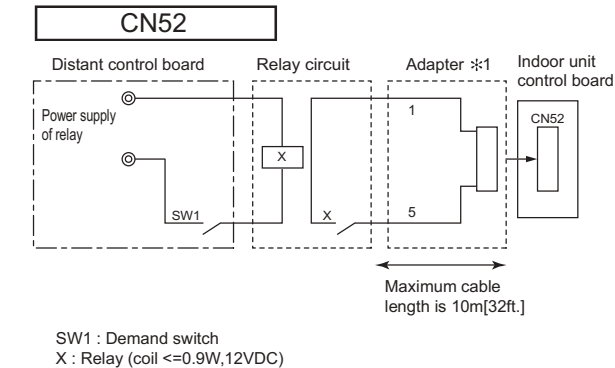
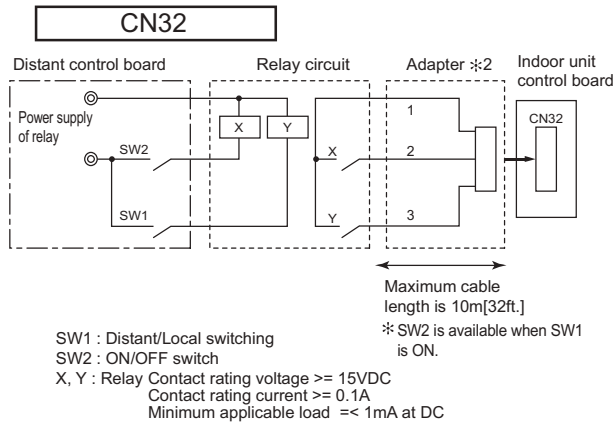
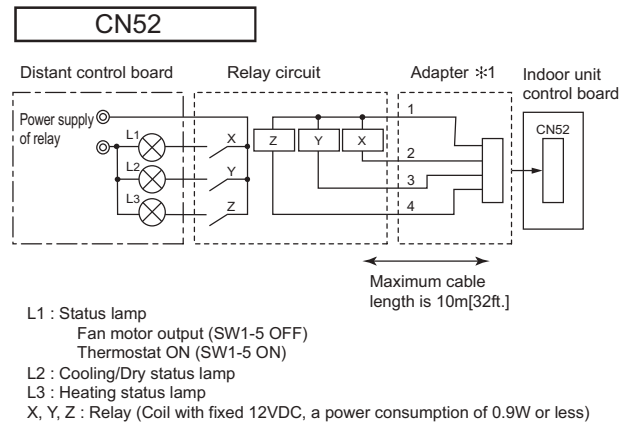
### ● ON/OFF (Pulse) input specification

Item	Description
Input signal	Pulse sign (a connect)
Standard of pulse	

### ● Input



### ● Output



SW1	Indoor unit
ON	Forced thermo-OFF
OFF	Normal running

- \* 1. Optional part : PAC-725AD or field supply  
 \* 2. Optional part : PAC-725AD or field supply